PIXE and STIM tomography for cell studies?

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A new sample holder has been installed at the University of Surrey proton microbeam for the purpose of Ion Beam Tomography. It allows detectors to be positioned very close to the sample. We plan to use two 80mm^2 Si(Li) detectors at 90 degrees to the beam and at a distance of approximately 10mm from the sample.

Three-dimensional quantitative elemental mapping of biological samples were performed using a combination of Proton Induced X-Ray Emission Tomography (PIXE-T) and Scanning Transmission Ion Microscopy-Tomography (STIM-T). With the high geometric efficiency, the PIXE-T data acquisition time required for reconstruction of trace element concentration distributions is considerably reduced as is the dose imparted to the sample.

The accuracy and potential applications are discussed and will show that three-dimensional trace element mapping can be performed routinely within reasonable data acquisition and reconstruction times.